

**Standard PS-3: The student will demonstrate an understanding of various properties and classification of matter.**

**Supporting Content Web Sites**

Density

[www.nyu.edu/pages/mathmol/textbook/density.html](http://www.nyu.edu/pages/mathmol/textbook/density.html)

This site describes density using visuals and formulas. It also includes calculations for students to submit online.

PS-3.1

Physical and Chemical Properties and Changes

[www.fordhamprep.org/gcurran/sho/sho/lessons/lesson15.htm](http://www.fordhamprep.org/gcurran/sho/sho/lessons/lesson15.htm)

Physical and chemical properties are described. Worksheets and online quizzes are available.

PS-3.1

Review and Practice on Chemical vs. Physical Properties and Changes

[www.teacherbridge.org/public/bhs/teachers/Dana/chemphys.html](http://www.teacherbridge.org/public/bhs/teachers/Dana/chemphys.html)

This site contains reviews of the concepts of chemical and physical properties and changes. It also has an online practice activity.

PS-3.1

Soap and Detergent Chemistry

[www.sdahq.org/cleaning/chemistry](http://www.sdahq.org/cleaning/chemistry)

This site gives information about how soap works, including a description of how nonpolar oils are used in soaps.

PS-3.2

What is the difference between a compound and a molecule?

<http://education.jlab.org/qa/compound.html>

This question and answer site answers questions relating to compounds and molecules.

PS-3.3

The Dissolving Process

[www.geocities.com/capecanaveral/Lab/1643/solutions2.html](http://www.geocities.com/capecanaveral/Lab/1643/solutions2.html)

This site examines the process of a solid dissolving in a liquid as well as factors affecting the rate of dissolving.

PS-3.5

Elements, Mixtures, and Compounds

<http://www.darvill.clara.net/hotpots/emc.htm>

The site is comprised of a matching game that allows students to match types of mixtures and compounds to diagrams.

PS-3.4

Skool.co.uk Chemistry

<http://lgfl.skool.co.uk/keystage3.aspx?id=64>

This site has a huge variety of chemistry topics including properties and states of matter, particle theory of matter, change in state, reactions of metals in acid, reactivity series of metals, acid and alkalis, acid base reactions and the pH scale.

PS-3.1, PS-3.6, PS-3.7, PS-3.8

GEMS Alien Juice Bar

<http://sv.berkeley.edu/showcase/flash/juicebar.html>

This site contains games that challenge students to learn about acids, bases, neutrals, and Ph.

PS-3.8

S-Cool Chemistry GCSE Acids and Alkalis

[http://www.s-](http://www.s-cool.co.uk/topic_principles.asp?loc=pr&topic_id=1&subject_id=21&ebt=212&ebn=&eb_s=&ebl=&elc=4)

[cool.co.uk/topic\\_principles.asp?loc=pr&topic\\_id=1&subject\\_id=21&ebt=212&ebn=&eb\\_s=&ebl=&elc=4](http://www.s-cool.co.uk/topic_principles.asp?loc=pr&topic_id=1&subject_id=21&ebt=212&ebn=&eb_s=&ebl=&elc=4)

This site provides review of the concepts of acid and alkali properties and explains the uses of neutralization. It also has sample questions for practice.

PS-3.8

### **Suggested Literature**

Gardner, R. (2004). *Science Fair Projects About the Properties of Matter Using Marble, Water, Balloons, and More*. Berkeley Heights, NJ: Enslow Publishers, Inc.

ISBN: 0-7660-2128-9

Lexile Level: NA

This book includes descriptions of elastic properties, properties of solids and liquids, and density of solids, liquids, and gases.

PS-3.1

Newmark, A. (2005). *Eyewitness Books-Chemistry*. New York: DK Publishing, Inc.

ISBN: 0-7566-1385-X

Lexile Level: NA

This book investigates mixtures and how they are separated, discerns atoms from molecules, and investigates elements and compounds. It also examines acids and bases with using pH and a discussion of indicators.

PS-3.4 and PS-3.8

Baldwin, C. (2006). *States of Matter*. Chicago: Raintree

ISBN: 1-41091-678

Lexile Level: NA

This book includes discussions on the properties of solids, liquids, gases, and plasmas. It also examines how matter changes states.

PS-3.6

*The Facts on File Dictionary of Inorganic Chemistry.* (2004). New York: Facts on File  
ISBN: 0-8160-4926-2

Lexile Level: NA

This book gives definitions as well as explanations of terms associated with inorganic chemistry. It also provides illustrations.

PS-3.2

*The Facts on File Dictionary of Organic Chemistry.* (2004). New York: Facts on File  
ISBN: 0-8160-4928-9

Lexile Level: NA

This book includes alphabetized entries on common organic terms.

PS-3.2

Hayhurst, Chris. (2003). *Bifuel Power of the Future: New Ways to Turning Organic Matter into Energy.* Springfield, NJ: Rosen Publishing Group

ISBN: 0-8239-3659-7

Lexile Level: NA

This book examines the pros and cons of using plant and animal wastes (organic matter) to meet our growing energy needs.

PS-3.2

### **Suggested Streamline Video Resources**

#### **Physical Science Series: Properties of Matter**

Characteristics of Matter

ETV Streamline SC

Describes properties as chemical and physical properties and gives examples.

1:26-5:19

PS-3.1

#### **Physical Science Series: Properties of Matter**

Density

ETV Streamline SC

This video shows application and formula of density. Also includes problem solving exercise.

8:20- 10:02

PS-3.1

#### **Physical Science Series: Mixtures and Solutions**

Solubility

ETV Streamline SC

This video describes solubility in terms of mass and temperature. Graphs are used to describe saturated and unsaturated solutions.

11:29 – 15:44

PS-3.1

**Physical Science Series: Phases of Matter**

Melting and Vaporization and Condensation, Freezing, and Sublimation

ETV Streamline SC

These two video segments explain the physical properties of freezing, condensation, melting, evaporation and sublimation.

5:12 -9:12

PS-3.1

**Elements of Chemistry: Carbon: The Element of Life**

Polymers and Plastics

ETV Streamline SC

Demonstrates applications of synthetic organic polymers and describes their properties.

13:08 – 15:26

PS- 3.2

**Energy and the Chemistry of Life**

Atoms and Elements and Molecules, Compounds, and Chemical Bonds

ETV Streamline SC

These segments explain the parts of the atom and compares sizes of atoms of different elements. It also explains bonding of molecules as a result of chemical reactions and gives a good description of chemical formulas.

22:54 – 29:15

PS- 3.3

**Physical Science Series: Mixtures and Solutions**

Classification of Matter and Mixtures

ETV Streamline SC

This video explains differences in heterogeneous and homogeneous mixtures and classifies these mixtures as colloids, suspensions, and solutions. It also explains the terms solute and solvent.

0:00 -7:29

PS-3.4

**Physical Science Series: Mixtures and Solutions**

Solubility

ETV Streamline SC

Agitation, particle size, and temperature are all examined as they relate to the rate of dissolving.

7:29-9:29

PS-3.5

**Elements of Chemistry: Gases, Liquids, and Solids**

Different States of Matter

ETV Streamline SC

This segment distinguishes among the attraction of particles in solids, liquids, and gases. It also describes how temperature is related to change of state.

8:30-12:10

PS-3.6

**Physical Science Series: Phases of Matter****Phase Changes**

ETV Streamline SC

This segment defines changes in matter due to heat transfer and temperature.

8:11-13:50

PS-3.7

**Chemistry Connections: Kinetic and Potential Energy Changes during Changes to States of Matter**

Phase Changes and Temperature-Time Graphs

ETV Streamline SC

This segment shows the use of probes to measure temperature changes throughout an experiment. Graphing using computers is also described.

1:04-12:43

PS-3.7

**Elements of Chemistry: Acids, Bases and Salts**

Properties of Acids and Bases

ETV Streamline SC

This segment gives several good examples of the properties of acids and bases.

0:00- 3:14

PS-3.8

**Elements of Chemistry: Acids, Bases, and Salts**

Strong and Weak Acids and Bases

ETV Streamline SC

The leveling of pH and water's ability to act in neutralization are described in this segment.

8:15-10:46

PS-3.8

**Chemistry Connections: Acids and Bases Defined**

Empirical Definition of Acid and Base Solutions

ETV Streamline SC

The properties and chemical activity of acids and bases are described in this segment. Also included are the uses of litmus, pH probes, and reactions with metals.

7:03-21:02

PS-3.8

## **Career Connections**

### **Chemistry Professor/Teacher**

Chemistry educators work using educational methods to teach students to appreciate how matter is composed and how it behaves. They also use mathematics to solve problems related to chemistry concepts. University professors will also do research and publish their findings.

### **Chemical Engineer**

Chemical engineers use chemical laboratory processes in an industrial setting in order to produce products such as fertilizers, pharmaceuticals, plastics, and food preservatives.

### **Inorganic Chemist**

An inorganic chemist primarily works with metals. They are especially important in the electronics industry where they have used their knowledge of materials chemistry to build components such as integrated circuits.

### **Organic Chemist**

An organic chemist often works with petroleum, wood products, plastics, textiles, as well as in the food industry. They may design new production processes for older materials as well as the development of synthetic materials.

### **Physical Chemist**

A physical chemist will study the physical properties of matter. Some topics they may study include the statistics on molecular interactions, combustion of plasma, and nuclear reactions.